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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/509,414
Filing Date: September 23, 2004
Appellant(s): LEMMA ET AL.

Brian S. Meyers (Reg. No. 46,947)
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal briefs filed 18 August 2008 and 28 July 2008 appealing from the Office action mailed 26 February 2008.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

No amendment after final has been filed.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

7,131,007	JOHNSTON et al.	10-2006
5,401,897	DEPALLE et al.	03-1995
6,209,094	LEVINE et al.	03-2001

Harris, Frederic J. "On the Use of Windows for Harmonic Analysis with the Discrete Fourier Transform." January 1978. Proceedings of the IEEE, vol. 66, no. 1. p. 51-83.

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

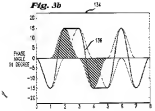
Claims 1, 5, 9, 10, and 13-17 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 7,131,007 to Johnston et al., hereinafter Johnston.

As per claims 1, 9, and 10, Johnston teaches a method of generating a watermark signal (column 2, lines 11-15) for embedding in a multimedia host signal (column 1, lines 22-25, i.e. digital watermarking means to embed some additional data into a host audiovisual signal that the watermark signal and the host signal are perceptually identical), the method comprising

taking a first sequence of values (column 2, lines 11-15, i.e. receiving an original signal);

applying a window shaping function having a predetermined width to said first sequence of values so as to form a smoothly varying signal (column 2, lines 11-15, i.e. using any known window function);

wherein the integral over the predetermined width of the window shaping function is zero



(such that the gray area is the window function over the period from 1 to 5 (and likewise, the clear period from 0 to 4) that results in the total positive area of the function being equal to the total negative area, such that the average area is zero,);

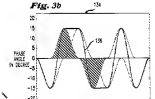
embedding said smoothly varying signal into the host signal (column 1, lines 22-25, column 5, lines 44-58, i.e. embedding the watermark in the k^{th} block of the audio signal).

Regarding claim 5, Johnson discloses phase modulation in column 5, lines 42-51. U.S. Patent No. 5,155,485 to Sako et al., hereinafter Sako teaches at column 1, lines teaches that digital modulating methods have been proposed to remove a DC component in a frequency spectrum of a modulated signal. Therefore, Johnston teaches wherein the frequency spectrum of the smoothly varying signal has a DC component less than a component of any non-DC peak within the frequency spectrum in disclosing phase modulation.

As per claims 13 and 16, Johnston teaches a method of detecting a watermark signal embedded in a multimedia signal, the method comprising:

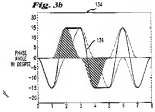
receiving a multimedia signal (column 7, lines 14-26, i.e. retrieving a watermark from a watermarked signal);

extracting an estimate of a watermark from the received signal by assuming that the watermark comprises a sequence of values to which a window shaping function having a predetermined width has been applied (Figure 4, column 7, line 29 to column 8, line 29), the integral over the predetermined width of the window function being zero (such that the gray area is the window function over the period from 1 to 5 (and likewise, the clear period from 0 to 4) that results in the total positive area of the function being equal to the total negative area, such that the average area is zero); and



processing the estimate of the watermark with a referenced version of the watermark so as to determine whether the received signal is watermarked (Figure 4, column 7, line 29 to column 8, line 29).

Regarding claims 14 and 17, Johnston teaches applying a window shaping function having the predetermined width to said received signal (column 2, lines 11-15, i.e. using any known window function), the integral over said predetermined width of the window shaping function being zero (such that the gray area is the window function over the period from 1 to 5 (and likewise, the clear period from 0 to 4) that results in the total positive area of the function being equal to the total negative area, such that the average area is zero).



Regarding claim 15, Johnston teaches wherein the watermark signal has a payload, and the method further comprising determining the payload of the watermark (Figure 4, column 7, line 29 to column 8, line 29).

Claims 2-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Johnston in view of U.S. Patent No. 5,401,897 to Depalle et al., hereinafter Depalle.

Regarding claims 2-4, Johnston does not teach wherein the window shaping function is a bi-phase window, comprising at least two Hanning windows of opposite polarities, with anti-symmetric temporal behavior.

Depalle teaches implementing a Hanning window (column 5, lines 35-57, i.e. Hann window), wherein the window shaping is a bi-phase window (column 5, line 64 to column 6, line 4, i.e. wherein a negative frequency term is added). The Appellant discloses at page 5, lines 16-21 that when a window shaping function is a bi-phase function it exhibits anti-symmetric

temporal behavior.

It would have been obvious to one of ordinary skill in the art at the time the invention was made for the window function to be a Hanning window function that created a bi-phase window with anti-symmetric temporal behavior, since Depalle states at column 6, lines 1-4 that it would create a representation of the sound wave for the duration chosen for the window function. By creating a representation of the sound wave, it would enable one of ordinary skill in the art to embed the watermarking data perceptually identical to the original signal, see Johnston, column 1, lines 22-25.

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Johnston in view of U.S. Patent No. 6,209,094 to Levine et al., hereinafter Levine.

Regarding claim 6, Johnston does not disclose wherein each value of the first sequence is represented by a pulse train of width T_s so as to form a rectangular wave signal, the window shaping function also being of width T_s.

Levin teaches wherein each value of the first sequence is represented by a pulse train of width T_s so as to form a rectangular wave signal (Figure 17B), the window shaping function also being of width T_s (Figure 17A, column 13, lines 36-50).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have a pulse train of a rectangular wave signal and the width of both the audiovisual signal and window function being the same width, since Levine states at column 13, lines 28-35 and lines 45-50 that such a modification would result in smoother transitions that are less perceptible.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Johnston in view of **On the Use of Windows for Harmonic Analysis with the Discrete Fourier Transform**, hereinafter Harris.

Regarding claim 7, Johnston does not teach wherein said first sequence of values is convolved with the window shaping function so as to form said smoothly varying signal.

Harris teaches wherein said first sequence of values is convolved with the window shaping function so as to form said smoothly varying signal (p 62, paragraph bridging column 1 and column 2).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to convolve the window function and the first sequence of values, since Harris states that convolving the signals in the frequency domain requires less memory or hardware since the samples of the cosine for the Hann window are already stored in the machine as the trig-table for the fast Fourier Transforms.

(10) Response to Argument

Response to arguments made with respect to claims 1, 5, 9, 10, 13-17

The Appellant's arguments focus on the limitation "applying a window shaping function having a predetermined width to said first sequence of values so as to form a smoothly varying signal, wherein the integral over the predetermined width of the window shaping function is zero." The Appellant specifically argues that the prior art fails to "expressly or inherently" describe "wherein the integral over the predetermined width of the window shaping function is zero."

The Examiner holds that very little patentable weight should be afforded to the clause "wherein the integral over the window function is zero." According to *Texas Instruments Inc. v. U.S. International Trade Commission,* 988 F.2d 1165, 172 [26 USPQ2d 1018] (Fed. Cir. 1993), a where[in] clause in a method claim is not given weight when it simply expresses the intended result of a process step positively recited. In independent claims 1 and 9, the wherein the integral over the window function is zero clause does not inform one of ordinary skill of the mechanics of how the smoothly varying signal is embedded into the host signal. See *Minton v. National Association of Securities Dealers Inc.*, 336 F.3d 1373, 1381, 67 USPQ2d 1614, 1620 (Fed. Cir. 2003); see also MPEP § 2111.04. Independent claims 13 and 16, the "wherein" is removed, but the clause "the integral over the window function is zero" remains. Again, the Examiner holds that very little, if any, patentable weight should be given to the clause since it is non-functional and descriptive. In the instant case no patentable weight should be given to the clause "wherein the integral over the window function is zero," the rejections are proper and should be sustained.

Even assuming *arguendo* that patentable weight should be given to the clause "wherein the integral over the predetermined width of the window shaping function is zero," the prior art discloses this feature, if not expressly, then inherently.

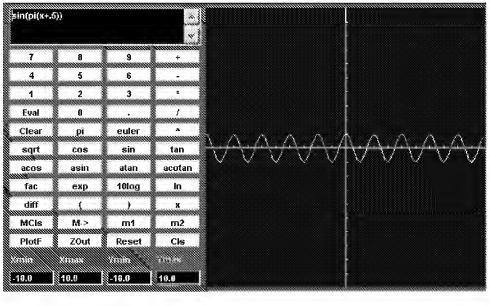
The Appellant defines that the integral over the window shaping function is zero as the total positive area of the function being equal to the total negative area, such that the average is zero at page 5, lines 17-19 of the specification of the instant application. The Appellant further shows an example of a waveform with an integral of zero in Figure 2. The Appellant points out on page 7 of the Brief of 28 July 2008 that the window function used is:

$$win(n) = \sin((\pi(n+.5))/N),\ 0 <= n <= N-1.$$

For the sake of argument, the Examiner has graphed the application where N = 1 and the limits are from $-\infty$ to ∞, such that the function would be:

$$win(n) = \sin(\pi(n+.5)),\ -\infty <= n <= \infty.$$

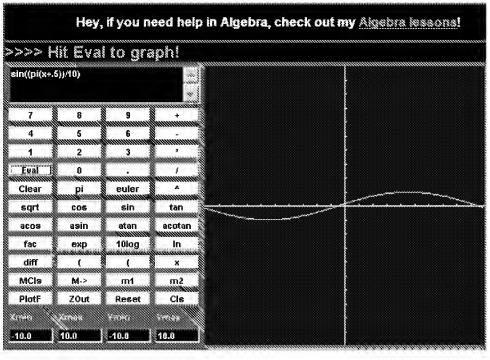
The graph produced by http://www.coolmath.com/graphit/index.html was:



Clearly, it is similar to Appellant's figure 2 in showing that the positive area is equal to the negative area, thereby averaging zero. Therefore, the integral over the window function of Johnston is zero. But what happens if we were to choose N = 10, such that the equation was:

$$win(n) = \sin((\pi(n+.5))/10), -\infty <= n <= \infty.$$

The graph produced from http://www.coolmath.com/graphit/index.html is:



Again, the graph shows that waveform is similar to the Appellant's figure 2 and that the positive area is equal to the negative area and therefore the integral over the window function would be zero. The windowing function as disclosed by Johnston is a sin function and therefore would have an integral of zero from $-\infty$ to ∞. The Examiner has shown in the graphs above that Johnston inherently discloses that the integral over the window function is zero by disclosing that the window function is $win(n) = \sin((\pi(n+.5))/N), 0 <= n <= N-1$. Therefore, the rejections of claims 1, 5, 9, 10, and 13-17 should be sustained.

Response to arguments made with respect to claims 5 and 10

Appellant's arguments with respect to claims 5 and 10 amount to a general allegation that the claims define a patentable invention without specifically pointing out how the language of the claims patentably distinguishes them from the references. Since the Examiner has shown the features argued above with respect to the independent claims, the rejection of the dependent claims is therefore proper since the Appellant did not argue any limitation from said dependent claims

Response to arguments made with respect to claims 14 and 15

Appellant's arguments with respect to claims 14 and 15 amount to a general allegation that the claims define a patentable invention without specifically pointing out how the language of the claims patentably distinguishes them from the references. Since the Examiner has shown the features argued above with respect to the independent claims, the rejection of the dependent claims is therefore proper since the Appellant did not argue any limitation from said dependent claims

Response to arguments made with respect to claim 17

Appellant's arguments with respect to claim 17 amount to a general allegation that the claims define a patentable invention without specifically pointing out how the language of the claims patentably distinguishes them from the references. Since the Examiner has shown the features argued above with respect to the independent claims, the rejection of the dependent claims is therefore proper since the Appellant did not argue any limitation from said dependent claims

Response to arguments made with respect to claims 2-4, 6, and 7

Appellant's arguments with respect to claims 2-4, 6, and 7 amount to a general allegation that the claims define a patentable invention without specifically pointing out how the language of the claims patentably distinguishes them from the references. Since the Examiner has shown the features argued above with respect to the independent claims, the rejection of the dependent claims is therefore proper since the Appellant did not argue any limitation from said dependent claims

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Christian LaForgia/
Primary Examiner
Art Unit 2139

Conferees:

/Matthew Heneghan/

Examiner, Art Unit 2139

/Kristine Kincaid/

Supervisory Patent Examiner, Art Unit 2139